

Five-Year Review Report

First Five-Year Review Report

for

**Motorola 52nd Street Superfund Site
Operable Unit Two (OU 2)**

Phoenix


Maricopa County, Arizona

September, 2001

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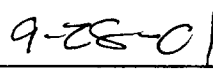


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List of Acronyms

AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
ARARs	Applicable or Relevant and Appropriate Requirements
ARS	Arizona Revised Statute
ATSDR	Agency for Toxic Substances and Disease Registry
CIP	Community Involvement Plan
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemicals of Potential Concern
COP	City of Phoenix
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
GAC	Granular Activated Carbon
gpm	gallons per minute
HASP	Health and Safety Plan
HESE	Harding ESE
MCL	Maximum Contaminant Level
mg/L	milligrams per Liter
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OX	Oxidation
ppb	parts per billion
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SRP	Salt River Project
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compound

Executive Summary

The first Five-Year Review for the Motorola 52nd Street Superfund Site, Operable Unit Two (OU 2), located in Phoenix, AZ was conducted by EPA. The second Five-Year Review for Operable Unit One (OU 1) is concurrently being completed by ADEQ and their contractor, Harding ESE. The remedy for OU 2 was selected in July 1994 as the second interim action at the site, and included containment of contaminated groundwater through extraction of the groundwater near 20th Street and Washington, and treatment of the groundwater in the vicinity of extraction. An ESD was completed in September 1999 modifying the treatment technology and end use of the water (from reinjection to discharge to the SRP grand canal). The remedy is currently under construction and expected to be completed this month.

The assessment of this five-year review found that the remedy is being constructed according to the requirements of the Record of Decision (ROD), ESD, and the approved design documents and modifications. Initial testing of the treatment system shows that the system is meeting the required treatment standards, however further review of the hydraulic monitoring program is necessary to ensure hydraulic containment standards will be met. Regarding the potential for exposure of the contaminated groundwater to the public, there are institutional controls in place to ensure exposure is limited, however there is a possibility private wells exist. Review of the ARARS determined that there are no newly promulgated standards, while review of the risk assessment revealed that toxicity values for certain chemicals of potential concern and the model used to project indoor air risks has have changed.

A protectiveness determination of the remedy at OU 2 has been deferred until further information is obtained on the issues that affect protectiveness. Further information will be obtained by the following actions: 1) ADHS will complete the public health assessment on groundwater use in the area; and 2) the previous risk calculations will be reviewed in light of changes to both inhalation toxicity values and the model used to project indoor air risks from subsurface. Also, more evaluation needs to be conducted by EPA to ensure the remedy will achieve the hydraulic containment standards. An addendum will be prepared by EPA within 6 months to reassess the protectiveness of the remedy.

In the meantime, the groundwater treatment system is meeting the required treatment standards, and the exposures at the site have been restricted through institutional controls to address immediate health threats: drinking water is being supplied to the public by the City of Phoenix, and ADWR permitting requirements on new groundwater wells provide a mechanism for which groundwater use may be identified and monitored. The site Health and Safety Plan is current and on-site, is sufficient to control health risks, and is being properly implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Motorola, Inc. (52 nd Street Plant)		
EPA ID (from WasteLAN): AZD009004177		
Region: 9	State: AZ	City/County: Phoenix/Maricopa
SITE STATUS		
NPL status: Final		
Remediation status: Under construction		
Multiple OUs? YES	Construction Completion Date: N/A	
Has site been put into reuse? NO		
REVIEW STATUS		
Lead agency: EPA (OU 2); State (OU 1)		
Author name: Nadia Hollan		
Author title: Remedial Project Manager	Author affiliation: USEPA, Region 9	
Review period: 03/07/00 to 09/27/01		
Date(s) of site inspection: N/A (on-going presence)		
Type of review: Post-SARA		
Review number: First (OU 2); Second (OU 1)		
Triggering Action: Actual RA Start at OU 1		
Triggering Action date (from WasteLAN): 11/16/95		
Due Date (five years after triggering action date): 11/16/00		

Issues:

- Evaluation of lower flow rates in extraction wells particularly EW-S not completed and revised model inputs have not been provided.
- Hydraulic monitoring well network possibly not adequate.
- Institutional controls regarding access to groundwater are not identified in the ROD as part of the remedy.
- Well inventory information is outdated.
- ARARs are not very specific.
- Boron is detected at the Arizona Surface Water Limit for agricultural irrigation, and is not in The Companies monitoring program.

Five-Year Review Summary Form, cont'd

- New chemicals of potential concern have been detected in the aquifer, as well as some chemicals may no longer be of concern.
- Model used for indoor air risk evaluation is outdated and there are new inhalation toxicity values.

Recommendations and Follow-up Actions:

- PRPs will submit remaining information and EW-S analysis and model inputs. EPA and ADEQ will need to conduct a thorough review of data.
- PRPs will update the Draft O&M Manual. EPA and ADEQ will need to conduct a thorough review of modified monitoring plans.
- EPA and ADEQ will evaluate institutional controls regarding access to contaminated groundwater for the final remedy.
- ADHS will complete a Draft Public Health Assessment on groundwater well use and make recommendations for further assessment.
- EPA and ADEQ will evaluate more specific ARARs and also consider AZ Surface Water Limits during final remedy evaluation.
- PRPs will add boron to the treatment plant monitoring program and the data will be reviewed to confirm protectiveness is not impacted.
- The list of COPC should be modified to reflect current groundwater conditions prior to next risk assessment. Monitoring program should be revised accordingly (mercury should be evaluated).
- Previous risk calculations for "current risk scenario in the baseline risk assessment (1992)" should be updated and air risk modeled using new model.

Protectiveness Statement:

A protectiveness determination of the remedy at OU 2 cannot be made at this time until further information is obtained on the issues that affect protectiveness. Further information will be obtained by the following actions: 1) ADHS will complete the public health assessment on groundwater use in the area; and 2) the previous risk calculations will be reviewed in light of changes to both inhalation toxicity values and the model used to project indoor air risks from subsurface. Also, more evaluation needs to be conducted by EPA to ensure the remedy will achieve the hydraulic containment standards. An addendum will be prepared by EPA within 6 months to reassess the protectiveness of the remedy. In the meantime, the groundwater treatment system is meeting the required treatment standards, and the exposures at the site have been restricted through institutional controls to address immediate health threats: drinking water is being supplied to the public by the City of Phoenix, and ADWR permitting requirements on new groundwater wells provide a mechanism for which groundwater use may be identified and monitored. The site Health and Safety Plan is current and on-site, is sufficient to control health risks, and is being properly implemented.

Five-Year Review Report

Motorola 52nd Street Site

Operable Unit Two (OU 2)

I. Introduction

The purpose of this review is determine whether the remedy at Operable Unit Two (OU 2) of the Motorola 52nd Street Superfund Site is expected to be protective of human health and the environment, and confirm that immediate threats have been addressed. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and provide recommendations to address them. This review is required by statute. Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, together with the implementing regulation in the National Oil and Hazardous Substances Pollution Contingency Plan, requires that the remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to assure protection of human health and the environment. Since hazardous substances, pollutants, or contaminants are left on site above levels that allow for unlimited use and unrestricted exposure, these reviews are required for this site.

The United States Environmental Protection Agency (EPA) Region 9 has conducted a Five-Year review of Operable Unit Two (OU 2) at the Motorola 52nd Street site in Phoenix, Arizona. The review was conducted from March 2000 through September 2001. This report documents the results of the review. This is the first Five-Year Review for OU 2. The Second Five-year Review for Operable Unit One (OU 1) is concurrently being prepared by the Arizona Department of Environmental Quality (ADEQ) with support from their contractor, Harding ESE. The triggering action for this review is the date of the signature of the first Five-year review at the site, as shown in EPA's WasteLAN database: November 16, 1995. Five-Year reviews should address all operable units (OUs) and remedial actions for which there is a Record of Decision (ROD) or Action Memorandum. OU 2 has been reviewed separately by EPA since EPA is the lead agency for OU 2, while ADEQ is the lead agency for OU 1. EPA and ADEQ have established a study area for a third Operable Unit, but this area is not subject to a five-year review since no decision document on this area has been issued.

This Five-year Review was prepared according to OSWER Directive 9355.7-03B-P, Comprehensive Five-Year Review Guidance, Draft October 1999. This document was finalized in June 2001 and used where possible.

II. Site Chronology

Table 1. Chronology of Site Events

Date	Event
07/89	Consent Decree #CV89-16807 executed between Motorola and ADEQ, requiring additional remedial investigation and feasibility study work off-site of the Motorola facility in addition to the OU 1 design and implementation
02/92	Final Remedy Remedial Investigation Report for OU 2 study area completed and Arizona Department of Health Services completes a Baseline Risk Assessment for the Site
11/92	EPA identifies AlliedSignal (now Honeywell) as a Potentially Responsible Party (PRP), operators at 34 th Street facility. Other parties identified, but subsequently determined not contributing to the OU 2 area groundwater contamination.
09/93	EPA identifies the City of Phoenix as a PRP, owners of a portion of the property AlliedSignal occupies
10/93	Interim Remedy Feasibility Study Report completed for OU 2
12/93	Supplement to the Interim Remedy Feasibility Study
07/94	Record of Decision signed requiring a groundwater containment remedy for OU 2
11/95	First Five-Year Review Completed for OU 1
04/97	Consent Decree #CV96-2626-PHX-ROS executed between Motorola, City of Phoenix, and ADEQ requiring design of OU 2 remedy
06/97	Remedial Design Work Plan approved
02/98	30% Remedial Design approved
11/98	Amended Unilateral Administrative Order #98-15 issued to Motorola and Honeywell for construction of OU 2 and two years operation and maintenance
02/99	UAO becomes effective; Motorola and Honeywell agree to comply; 90% Remedial Design approved
04/99	Selection of supervising contractor, Black & Veatch
05/99	EPA authorization for Remedial Action to proceed
09/99	Explanation of Significant Difference (ESD) for OU 2 signed, modifying end use and treatment technology
12/99	Final 100% Remedial Design approved
02/00	Remedial Action Work Plan approved
03/00	On-site construction started
08/01	Treatment system initial commissioning/testing

III. Background

Physical Characteristics

The Motorola 52nd Street Site is located in Phoenix, Arizona. The OU 2 area consists of groundwater contaminated with dissolved volatile organic compounds (VOCs) such as trichloroethylene (TCE). The area is located hydraulically downgradient of OU 1 and is situated between McDowell Road on the north, Buckeye Road on the south and extends westerly to approximately 20th Street (see Attachment 1).

Land and Resource Use

There is a mixture of residential, commercial and industrial uses of the land overlying the site. The groundwater at the site is not currently used as a source of drinking water. The City of Phoenix supplies drinking water to the area from sources outside of the site.

History of Contamination

The use of industrial cleaning solvents during the late 1950's to early 1980's led to the groundwater contamination through common storage, disposal and other waste management practices. The groundwater contamination in OU 2 resulted from migration of groundwater contamination from the Motorola 52nd Street facility and solvent contamination that has migrated into the aquifer from other sources, such as the Honeywell 34th Street facility. The facility is currently being investigated by Honeywell under ADEQ oversight. Other industries in the area have possibly contributed as well. EPA is currently updating the PRP search for OU 2 in an attempt to identify additional potential responsible parties to the groundwater contamination.

Basis for Taking Action

The chemicals of potential concern for the groundwater at the site as identified in the 1992 Baseline Risk Assessment and the 1994 OU 2 ROD include both VOCs and inorganics, and are provided in Attachment 2. In the Baseline Risk Assessment conducted in 1992, potentially exposed populations are residents living near the facility and workers at the facility (referring to the Motorola facility, but could be applied to the Honeywell facility). There were no private or public drinking water wells that were identified to be supplying drinking water from the known area of contamination. The assessment concluded that the risk of public exposure to groundwater was limited, causing no imminent health hazard. Vadose zone remediation was not the goal of the OU 2 remedy, therefore exposures to contaminated soils or soil gas were not addressed in detail in the summary of site risks. Since the potential risk from exposure to contaminated groundwater is at an unacceptable level, additional groundwater remedies were determined to be necessary at the site. The conclusion of the Risk Assessment and the RI/FS presented in the ROC was that releases of hazardous substances from this site presented an imminent and substantial endangerment to public health, welfare, and the environment in the absence of any remedial action.

IV. Remedial Actions

Remedy Selection

The OU 2 ROD was signed in July 1994 selecting an interim groundwater containment remedy for the site. Specifically, OU 2 addresses groundwater contamination in eastern Phoenix in the area west of the Old Crosscut Canal and east of Interstate 10. OU 2 was classified as an interim action in order to reflect the possibility that additional remedial actions in this area may be needed. EPA and ADEQ will use information collected during operation of the selected remedy to help determine the need for additional actions and the nature of the final remedy.

The specified remedial objectives of this interim action are to establish a capture zone across the entire width and depth of the contaminant plume, and to reduce concentrations of contaminated groundwater within the alluvial aquifer upgradient of the extraction wells. An additional objective of this remedy is to collect and analyze groundwater quality, groundwater flow, and other hydrogeologic data during implementation and operation of the remedy to support the selection of additional remedial actions for the site. The OU 2 ROD also specified that groundwater will be extracted and treated to a level at or below Maximum Contaminant Levels (MCLs).

The primary components of the selected remedy include:

- Installation of extraction wells and extraction of groundwater in the vicinity of Interstate 10 and Van Buren Street with the actual location, number of wells and pumping rate to be determined in the design;
- Treatment of extracted water near extraction locations by either air stripping with off-gas treatment by synthetic resin adsorption, or advanced oxidation based on final design considerations;
- Piping of treated water to injection wells for injection back into the aquifer in locations in a manner to facilitate hydraulic containment;
- The installation and sampling of groundwater monitoring wells, the sampling of existing monitoring wells, measurement of water levels at monitoring, extraction and injection wells, and the measurement of other aquifer properties in order to: 1) evaluate the effectiveness of the remedy in meeting the remedial objectives; 2) verify or revise contaminant influent concentration estimated that will be used in the design of the OU treatment facilities; 3) provide an early warning network so that changes in the groundwater flow regime or contaminant concentrations that may require modifications in extraction rates, well locations or treatment methods are identified in time to institute the necessary facility and operational change; and 4) help determine the need for implementing additional remedial actions in Operable Unit Two and the nature of the final remedy.

The ROD also required that groundwater monitoring begin during remedial design to provide data necessary to complete the final design and to establish pre-implementation conditions, and that containment of the plume at this location will be achieved within one year of system start-up. The ROD anticipated that this interim remedy would continue to operate and would be combined with additional remedies leading to the final remedy for the site.

In September 1999, an Explanation of Significant Differences (ESD) was signed by EPA and ADEQ due to developments during the design which modified the end use of the water to discharge to an agricultural irrigation canal, and the treatment technology to ultraviolet oxidation and granular activated carbon. These modifications are described in the next section.

Remedy Implementation

The Remedial Design (RD) process was started in April 1997. During the design, Motorola evaluated a combination of ultraviolet oxidation and granular activated carbon technologies in addition to air stripping and the other technologies identified in the ROD. They proposed pre-treatment with ultraviolet oxidation and primary treatment with granular activated carbon as the most effective treatment process. The process was also preferred because it eliminated the need for air emissions. Motorola also negotiated an agreement with the Salt River Project (SRP) to take treated water into the Grand Canal. Motorola determined that reinjection was not necessary to ensure the hydraulic capture, and requested approval of the new end-use, which had been an alternative remedy evaluated in the ROD. These modifications were approved in September 1999 by EPA and ADEQ in an ESD. The Final 100% Design was completed in December 1999 by Motorola under ADEQ oversight. The major components of the design included: 5 new monitoring wells (2 to be installed after capture is achieved); 3 extraction wells to be pumped at a combined flow rate of 5,300gpm; influent piping from the extraction wells to the treatment facility (HDPE); treatment facility at 20th Street and Washington; and effluent piping of the treated water to the discharge point (ductile iron).

The Remedial Action process was initiated in February 1999 by Motorola and Honeywell ("The Companies"), pursuant to Amended EPA Unilateral Administrative Order (UAO) #98-15, issued in November 1998. The UAO required that The Companies construct the OU 2 remedy and operate it for two years. Attachment 3 outlines the minor and major deliverables associated with the UAO, including the schedule, which has been modified from the original order through various correspondences from the EPA RPM throughout the project. The Companies selected Black & Veatch as the supervising contractor, and Hunter Corporation as the general construction contractor. The Companies also hired a public relations firm, BJ Communications, to assist with community outreach and to ensure the affected community was informed throughout the construction. On-site construction began in March 2000, and is expected to be completed in late September 2001. EPA has been overseeing the remedial action with assistance from the US Army Corps of Engineers (USACE) through an interagency agreement (#DW-96955414-01), and IT Corporation, contractor to the USACE (#DACW05-96-D-0011).

The installation of 3 monitoring wells (NW-1, NW-2, and NW-3), 3 extraction wells (EW-N, EW-M, and EW-S), and the influent and discharge pipelines have been completed, while the construction of the treatment facility is nearing completion (see fact sheets in Attachment 4). There were a few modifications from the original design that were approved during construction. First, portions of the discharge pipeline needed to be relocated on Van Buren Street in order to accommodate a request from the City of Phoenix. Due to the new location, the discharge pipeline needed to be constructed in some places above the influent water pipeline. The changes in the design and construction modifications necessary to accommodate this pipeline relocation resulted in 76 days delay. EPA approved of the modifications including the scheduling delays.

A few additional modifications to the design were also approved by EPA: elimination of the air scour system and hydrochloric acid treatment, and lower groundwater extraction rates due to lower than anticipated groundwater yield. The water quality data collected during pump testing indicated that the potential for scaling of the system was minimal and the air scour system and hydrochloric treatment were no longer necessary. However, the system components were retained in the design in order to accommodate installing these subsystems at a later date should the water quality change or the system produces more scaling than anticipated. Due to the reduction in anticipated flow rates (total combined flow reduced from 5,300 gpm to 4,700 gpm), the well pump requirements were modified, and the number of required carbon adsorbers have been reduced. Regarding the effect of the lower flow rates on the hydraulic capture, the EPA is currently reviewing this issue.

An OU 2 baseline monitoring plan was submitted by Motorola and Honeywell on April 20, 2001. The baseline monitoring plan submittal, not previously required by the EPA or ADEQ, was determined necessary to establish baseline aquifer conditions prior to starting of the OU 2 treatment system. At EPA and ADEQ request, additional wells were added to the plan to be voluntarily sampled by Motorola and Honeywell in July 2001 and in September 2001 to coincide with a region-wide sampling event.

The Draft Operations and Maintenance (O&M) Manual was submitted to EPA in May 2001. The document outlines procedures for initial testing, startup, and operation of the plant, treatment system and groundwater hydraulic monitoring, system maintenance, and other information necessary for long-term operation and monitoring of the treatment system. EPA provided comments on the document, dated June 27, 2001. Motorola and Honeywell provided responses to the comments pertaining to initial system testing and startup on July 31, 2001 and August 13, 2001. EPA approved the initial startup and commissioning procedures on August 21, 2001, and startup of the treatment plant commenced that day. The revised O&M Manual will be due 30 days after completion of construction.

V. Progress Since the Last Review

This is the first Five-Year Review for Operable Unit Two.

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process

The initiation of the Five-Year review process was conducted by ADEQ, and described in the accompanying OU 1 Five-Year Review Report. EPA, with support from ADEQ, is conducting this review of OU 2. Nadia Hollan, the EPA Project Manager for the Motorola 52nd Street Site is responsible for overseeing the construction activities at OU 2, and is leading the OU 2 review. She obtains support from the US Army Corps of Engineers and their contractor IT Corporation through an Interagency Agreement and in-house support from Viola Cooper, EPA Community Involvement Coordinator, Herb Levine, EPA Hydrogeologist, Stan Smucker, EPA Toxicologist, and Allyn Stern, EPA Regional Counsel. ADEQ Project Manager, Kris Kommalan, and Hydrologist, John Kivett, also provide support on OU 2.

Community Involvement

Community involvement activities relating to the Five-Year Review are primarily described in the accompanying OU 1 Five-Year Review Report. With regards to general community involvement activities for OU 2, after EPA became the lead for OU 2 activities in early 1999, EPA began updating the Community Involvement Plan (CIP) for the site in conjunction with ADEQ. EPA conducted several interviews with the OU 2 community in December 1999 and April 2000 to gather information for this plan. The draft CIP (published in both English and Spanish), dated January 2001, was made available for public comment on March 19, 2001, and is currently being finalized. The primary concerns of the community in OU2 related to having access to enough information about the project, health impacts, the current status of contamination and understanding the proposed cleanup.

Throughout the OU 2 design and construction process, public meetings were conducted and fact sheets were issued by EPA and ADEQ, often in conjunction with the PRPs, to inform the community of OU 2 status, and provide the public the opportunity to share their interests and concerns. EPA and ADEQ also periodically met with area community leaders and neighborhood groups. During construction, The Companies, with support from BJ Communications, distributed informational fliers relating to the construction activities to the residences and businesses impacted directly by the construction. They also set up a telephone hotline for individuals to leave messages concerned about the construction activities, and worked directly with the community to resolve issues that came up. See Attachment 4 for examples of fact sheets and informational fliers distributed for OU 2.

EPA worked with a Technical Advisory Grant recipient, Gateway Neighborhood Coalition, from May 1993 until the expiration of the grant in December 1999. A Technical Assistance Grant is still available for this site, and EPA is currently soliciting applications for the grant. Most recently, EPA has worked with ADEQ to form a Community Advisory Group for the Site, which formed in early 2001.

Document Review

The following primary site documents have been reviewed:

- Baseline Health Risk Assessment, Motorola 52nd Street Facility, Phoenix Arizona, prepared by ADHS, November 1992
- Record of Decision, Operable Unit Two East Phoenix Groundwater Containment, Motorola 52nd Street Superfund Site, Phoenix Arizona, July 1994
- Amended Unilateral Administrative Order, #98-15, Motorola 52nd Street Superfund Site, November 1998
- Final (100%) Remedial Design Report, Operable Unit 2 Area, Motorola 52nd Street Superfund Site, Phoenix, Arizona, prepared by CRA for Motorola, Inc., July 1999
- Explanation of Significant Differences (ESD #1) to July 1994 Record of Decision, Operable Unit Two East Phoenix Groundwater Containment, Motorola 52nd Street Superfund Site, Phoenix, Arizona, September 1999
- Remedial Action Work Plan, Operable Unit 2 Area, Motorola 52nd Street Superfund Site,

- Phoenix, AZ, prepared by CRA on behalf of AlliedSignal, Inc. and Motorola, Inc., November 1999 (includes Sampling and Analysis Plan and Health and Safety Plan)
- Technical Memorandums and supporting information, prepared by Black & Veatch on behalf of Honeywell, Inc. and Motorola, Inc., October 2000
 - Draft Operation and Maintenance Manual, Operable Unit 2 Area, Motorola 52nd Street Superfund Site, Phoenix, AZ, prepared by CRA on behalf of Honeywell, Inc. and Motorola, Inc., May 2001
 - The following routine documentation: Weekly OU 2 meeting minutes; Monthly OU 2 construction progress reports and meeting minutes; USACE OU 2 oversight reports (March 1999-current)

Data Review

Groundwater Quality Monitoring Data

Groundwater quality monitoring was conducted at the site during remedial design activities in 1996 and 1997. During construction activities, groundwater quality monitoring was also conducted for each extraction well during pump testing and for the newly installed monitoring wells. Additional rounds of groundwater monitoring were conducted in July and September 2001 as part of the baseline monitoring plan. This data, taken collectively, will establish a baseline for groundwater quality conditions prior to OU 2 remediation. This information will be compiled and reviewed after the September 2001 sampling effort has been completed and the data validated. The long-term groundwater quality monitoring plan for OU 2 proposed in the Draft O&M Manual, is currently being revised according to EPA comments.

The contaminants in groundwater that currently occur in the aquifer above Federal primary drinking water criteria, or Maximum Contaminant Levels (MCLs) are: tetrachloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (DCE), 1,1-DCE, vinyl chloride, and chloroform. There are detections of some compounds that were not originally included in the list of chemicals of potential concern (COPC): nitrate (as N), nitrate/nitrite (total), barium, copper, mercury, trans-1,2-dichloroethylene. There may be other constituents which are no longer detected in the aquifer that were classified as COPC, however the data was not evaluated to make this determination. There are no other aquifer characteristics in OU 2 have been known to change significantly since the RI/FS.

Treatment Plant Data

Initial treatment plant influent and effluent data were collected during recent testing of the OU 2 treatment system (see Attachment 5). EPA compared the initial data to the Federal MCLs, and also compared the data to the State MCLs and to the Arizona Surface Water Limits for agricultural irrigation and livestock watering for constituents that have stricter standards than the Federal MCLs (see Attachment 6). Based on both The Companies' data and EPA's split sampling data of the treatment plant effluent, none of the constituents exceed the Federal or State MCLs, and most samples show non-detect. EPA's split sampling data reveals that boron is at the agricultural irrigation standard (1 mg/L), however there is no data for boron to the canal water itself, since EPA did not take a sample downgradient of the discharge point. Boron was not reported by The Companies since it is not currently included in their monitoring program.

Pump Testing and Hydraulic Monitoring

Pump testing of the extraction wells was conducted after each extraction well was installed to confirm design pumping levels and hydraulic conductivities that were previously determined by aquifer pump testing and groundwater modeling conducted during the design. The results of the testing showed that the flow rates are lower than anticipated, particularly with EW-S. EW-S was redeveloped and re-tested and preliminary results showed some improvement, however the final data is still under review. The Companies are currently conducting a more complete review of the pumping test data and groundwater modeling inputs, and EPA is awaiting these final results based on the EW-S retesting. The Companies have proposed a groundwater level monitoring program in the Draft O&M Manual, which is intended to provide the necessary data to demonstrate the effectiveness of the containment system.

Site Inspection

The US Army Corps of Engineers has been routinely inspecting the site (approximately 1-3 times per week), and reporting to EPA on a weekly or bi-weekly basis. The Companies also have been reporting construction progress to EPA on a weekly basis. EPA has been conducting a site inspection of the construction activities on a monthly basis. The purpose of the inspections and the status reporting are to ensure that the Remedial Action Plan is being followed including appropriate health and safety measures. There have been no significant issues identified that indicate the construction is not being conducted according to the approved plans.

Interviews

Site interviews were not necessary since EPA has an ongoing presence at OU 2. Activities conducted during construction oversight include regular site visits (at least weekly by USACE, monthly by USEPA), oversight sampling, participation in weekly status meetings, and review of monthly progress reports.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Compliance With Requirements of the Decision Documents and Design Specifications

The primary requirements of the OU 2 ROD and ESD are to provide for a groundwater treatment system that hydraulically contains the contaminated groundwater plume at 20th Street and treats the extracted groundwater to meet drinking water standards. The system is being constructed according to the requirements with the design and approved modifications. Initial data from the testing of the treatment system indicate that the system meets the required treatment standards. EPA has assessed that the monitoring of the treatment plant effluent is sufficient to ensure the treatment system will achieve its treatment goals.

The system will need to operate for approximately one year before it can be established whether the system is meeting hydraulic containment standards. EPA raised concerns regarding the adequacy of the proposed groundwater quality and hydraulic monitoring program and

provided recommendations in the Draft O&M Manual comment letter to Motorola and Honeywell dated June 27, 2001. EPA has also raised concerns in several correspondences to The Companies with regards to the adequacy of the pump testing and design modeling conducted at the site, and the affect these analyses would have on the establishment of an adequate monitoring program. After The Companies submit the revised monitoring program, remaining pump testing data and modeling inputs, EPA plans to carefully review this information to ensure that proper data will be collected to adequately evaluate the degree of hydraulic containment. In addition, after the results of the baseline monitoring program are finalized, this data will be reviewed in conjunction with the other information to better evaluate the proposed monitoring programs and expected performance of the hydraulic containment system.

EPA's review of the on-going construction activities reveals that appropriate construction and oversight activities are taking place, including the proper QA/QC. A final Health And Safety Plan for the OU 2 Remedial Action Project was submitted in November 1999 with the Remedial Action Work Plan and accepted by EPA. As discussed previously, the USACE visits the site on a regular basis on behalf of EPA to oversee the work taking place on the site and the Health and Safety procedures being followed. The plan is being properly implemented to protect workers and mitigate short term threats. No significant health and safety issues have arisen. When the potential for health and safety issues has arisen, the site Health and Safety Officer, Rich Houghton of Black & Veatch, has been contacted to mitigate the issue. All potential issues have been resolved according to EPA and the USACE's satisfaction.

During extraction and monitoring well installation, air monitoring was conducted to ensure there were no exposures to the workers, and data indicated there were no significant levels of concern. With regards to the site security, there have been adequate fencing and signs in place to prevent exposure to the physical hazards of construction, and security guards to ensure the site is secure during non-working hours.

Implementation of Institutional Controls and Other Measures

There are no institutional controls specified in the ROD. With regards to the potential for exposure of contaminated groundwater to the public at OU 2, there are some measures in place to ensure groundwater is not used for drinking water purposes. For example, the City of Phoenix supplies drinking water to the public from primarily surface water sources outside of the site. For this reason there appears to be no need to install domestic wells in Phoenix. However, there is a slight possibility that a citizen could unknowingly drill a well into the plume and drink contaminated water. The ADWR regulates the drilling of wells in the state, and all wells drilled must be permitted by ADWR. Licensed drillers may not legally drill a well without such a permit. Because all individuals who apply for drilling permits within or near the site are informed by ADWR that the groundwater is contaminated, this should deter individuals from installing and using domestic wells for potable use. As a matter of policy, ADWR contacts both ADEQ and EPA when wells are proposed for sites where groundwater is contaminated. In addition, ADWR regulates well construction so that vertical cross-contamination between aquifers does not occur at sites such as Motorola 52nd Street. EPA recommends that institutional controls such as these regarding access to contaminated groundwater be evaluated for the final remedy.

There is no current information to indicate that there are private wells within the known area of contamination, however anecdotal evidence from the community indicates private wells may exist for other uses. Therefore, since the previous well inventories conducted for the site may be incomplete or out of date, EPA requested in June 2001 that ADHS conduct a public health assessment with regards to exposure to contaminated groundwater at the site, however the study has not been completed to date. It is expected that ADHS will complete a draft public health assessment based on well inventory research to date within the next few months, and make recommendations for additional well inventory research if necessary.

Question B: Are the assumptions used at the time of remedy selection still valid?

Changes in Standards and TBCs

The following standards were identified as applicable or relevant an appropriate requirements (ARARs) in the ROD and as modified by the ESD, and were reviewed for changes that could affect protectiveness:

- Endangered Species 16 U.S.C. §1531 et seq.
- Fish and Wildlife 16 U.S.C. §661 et seq., 40 CFR §6.302
- National Archeological and Historical Preservation Act, 16 U.S.C. §469, 36 CFR Part 65, A.R.S. §41-841-847 and A.R.S. §41-865
- Action Specific ARARs
- New Well Construction & Groundwater Use Requirements, Arizona Revised Statue, Title 45; 45 A.R.S §454.01; and §45-594, -595, and -596
- “Contained in” principle Arizona Hazardous Waste Management Act (AAC R18-8-261)
- Arizona Hazardous Waste Management Act, AAC R18-8-262
- Arizona Hazardous Waste Management Act Land Disposal Restrictions, AAC R18-8-268
- Federal Hazardous Materials Transportation Law, 49 U.S.C. §§5401, et seq. and associated rules, 49 C.F.R. Parts 107, 171.1-172.558.
- Section 402 of the Clean Water Act, 33 U.S.C. §1342

There are no newly promulgated standards or revisions to the ARARs that would call into question the protectiveness of the remedy, however the ARARs provided in the decision documents were difficult to review because they were not very specific. It is recommended that for the final remedy, the standards that apply under each regulation be more specifically identified.

The Federal MCLs were selected to apply to the treated groundwater, and as discussed earlier, it is expected that the treatment system will continue to meet these standards. However, the Arizona MCLs and the Arizona Surface Water Limits for Agricultural Irrigation and Agricultural Livestock, in Arizona Administrative Code Title 18, establish standards for some of the contaminants of concern which do not have established Federal MCLs (see Attachment 6). Since it was discovered in EPA’s samples that boron in the effluent discharge was at the Agricultural Irrigation level, EPA recommends that The Companies report boron data as part of their monitoring program, particularly at the discharge point and downgradient of the discharge point to ensure the canal is not impacted. EPA also recommends that these Arizona standards be considered during selection of a final remedy, since EPA prefers that the water is treated for it’s

highest use (most stringent standard applies).

It should be noted that the arsenic MCL, currently at 50ppb (0.05 mg/L), is expected to change to a lower level in the near future, with 10ppb under consideration. The current level in the extracted groundwater is 7ppb on average, and typically below 10ppb, therefore the anticipated change in the arsenic standard is not expected will pose a protectiveness issue with regards to the treated effluent. EPA's Region 9 lab has a reporting limit of 20 ppb, so the detection limit may need to be adjusted if a lower standard for arsenic is promulgated. Since arsenic is in treatment plant monitoring program, it will continue to be closely monitored.

Changes in Exposure Pathways, Toxicity and Other Contaminant Characteristics

Land use at the site is relatively the same, and no new human health or ecological routes of exposure have been identified.

The COPC from the April 1992 ADHS Baseline Risk Assessment were surveyed for differences in the current toxicity values to those presented in the Risk Assessment. The comparison of the toxicity values to previous and current values and the analysis of toxicity value changes for impact on the risk assessment and associated decision making is listed for each chemical in Attachment 7.

The result of the analysis is that the changes in toxicity values could lead to an increased estimation of risk, particularly for the air pathways (indoor and outdoor). This does not necessarily imply that the remedy would change, however. The 1992 risk assessment demonstrated sufficiently high risk that (in conjunction with MCLs) provides a justification for long-term treatment of the groundwater. Because the risks would likely be higher today if recalculated using updated toxicity values, the remedial action should continue.

The groundwater monitoring data collected at the site revealed there are additional constituents being detected in the aquifer that weren't originally included in the COPC list: nitrate (as N), nitrate/nitrite (total), barium, copper, mercury, trans-1,2-dichloroethylene (not distinguished between cis-1,2-dichloroethylene in the risk assessment). The health risks associated with these constituents could also modify the results of the health risk assessment, but would not impact the protectiveness of the selected remedy as explained in the paragraph above. These constituents are regularly monitored in the groundwater water quality monitoring program with the exception of mercury. It is recommended that the levels of mercury in the aquifer be verified, and if detections continue, added to the groundwater quality monitoring program. It is also recommended that when the risk assessment is updated, the list evaluation as COPC be modified as appropriate to reflect current groundwater quality conditions.

Changes in Risk Assessment Methods

The 1992 risk assessment methodology used was based on EPA "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual: Part A" (1989). Current methodology for risk assessment has not changed, however, the air model used to estimate indoor risks (Johnson and Ettinger, 1998) has changed and it would be prudent to model

“current” risks based on this newer model and the updated toxicity values.

As a follow-up to this five year review, it is recommended that the previous risk calculations for “current risk scenario in the baseline risk assessment (1992)” should be updated or at least revisited in light of changes to both inhalation toxicity values and the model used to project indoor air risks from subsurface contamination. This evaluation would be particularly useful after the TCE reassessment (currently draft out for public comment) becomes final (tentative date is Spring 2002) as the expectation is that the risks due to TCE (the primary contaminant of concern) will be increased.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy.

VIII. Issues

Table 2. Issues

	Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1	Evaluation of lower flow rates in extraction wells particularly EW-S not completed and revised model inputs have not been provided.	N	Y
2	Hydraulic monitoring well network possibly not adequate.	N	Y
3	Institutional controls regarding access to groundwater are not identified in the ROD as part of the remedy.	N	N
4	Well inventory information is outdated.	Y	Y
5	ARARs are not very specific.	N	N
6	Boron is detected at the Arizona Surface Water Limit for agricultural irrigation, and is not in The Companies monitoring program.	N	N
7	New chemicals of potential concern have been detected in the aquifer, as well as some chemicals may no longer be of concern.	N	N
8	Model used for indoor air risk evaluation is outdated and there are new inhalation toxicity values.	Y	Y

IX. Recommendations and Follow-up Actions

Table 3. Recommendations and Follow-up Actions

Issue	Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)?	
					Current	Future
1 Extraction wells	PRPs will submit remaining information and EW-S analysis and model inputs. EPA and ADEQ will need to conduct a thorough review of data.	Honeywell & Motorola	EPA/ADEQ	10/15/01	N	Y
2 Hydraulic monitoring	PRPs will update the Draft O&M Manual. EPA and ADEQ will need to conduct a thorough review of modified monitoring plans.	Honeywell & Motorola	EPA/ADEQ	10/24/01	N	Y
3 Institutional controls	EPA and ADEQ will evaluate institutional controls regarding access to contaminated groundwater for the final remedy.	EPA/ADEQ	EPA/ADEQ	N/A	N	N
4 Well inventory	ADHS will complete a Draft Public Health Assessment on groundwater well use and make recommendations for further assessment.	ADHS/ATSDR	EPA/ADEQ	10/26/01	Y	Y
5 ARARs	EPA and ADEQ will evaluate more specific ARARs and also consider AZ Surface Water Limits during final remedy evaluation.	EPA/ADEQ	EPA/ADEQ	N/A	N	N
6 Boron monitoring	PRPs will add boron to the treatment plant monitoring program and the data will be reviewed to confirm protectiveness is not impacted.	Honeywell & Motorola	EPA/ADEQ	10/15/01	N	N
7 COPC	The list of COPC should be modified to reflect current groundwater conditions prior to next risk assessment. Monitoring program should be revised accordingly (mercury should be evaluated).	Honeywell & Motorola	EPA/ADEQ	10/15/01	N	N
8 Indoor air risks	Previous risk calculations for "current risk scenario in the baseline risk assessment (1992)" should be updated and air risk modeled using new model.	EPA or ADHS/ATSDR	EPA/ADEQ	04/01/02	Y	Y

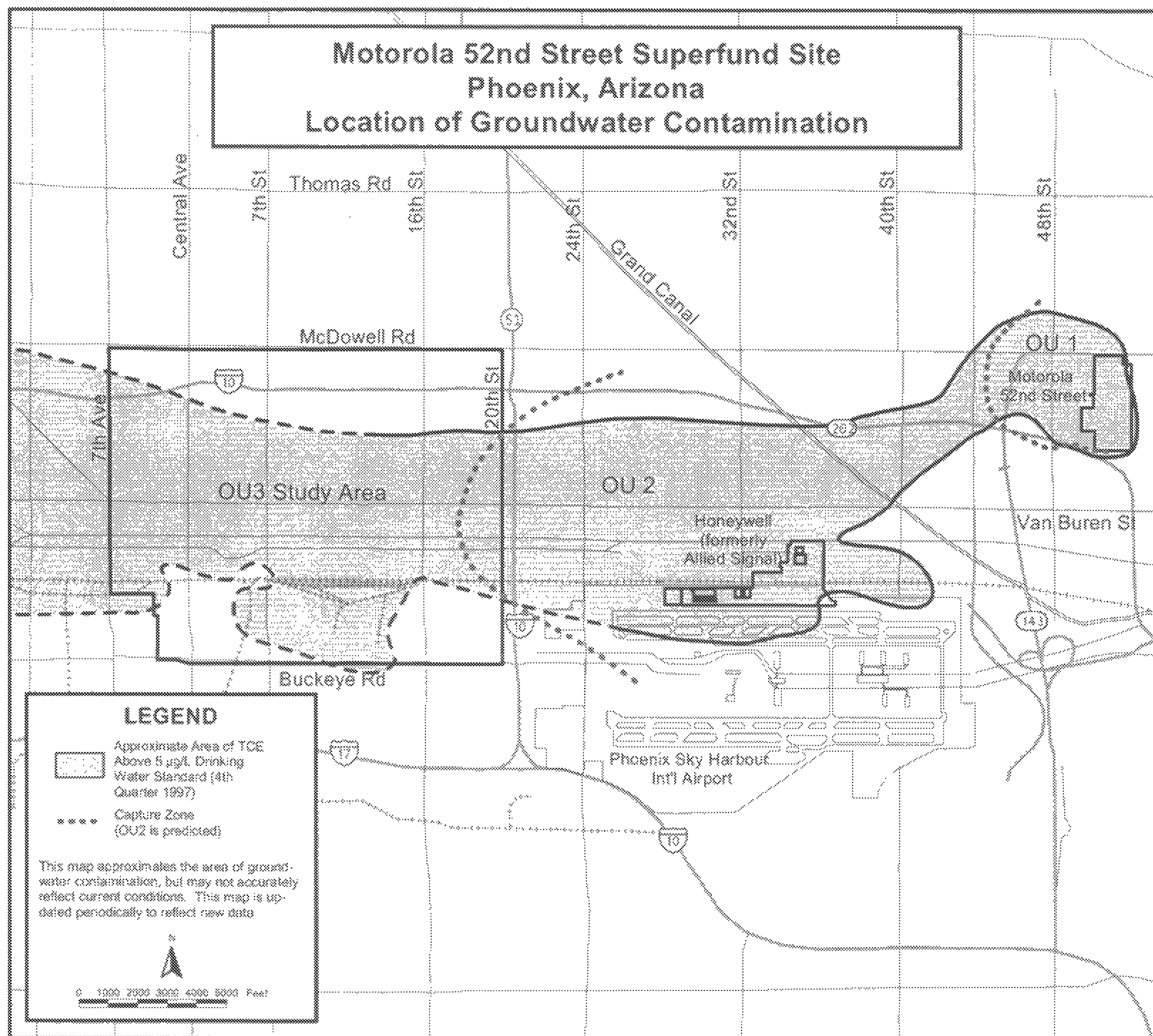
X. Protectiveness Statement

A protectiveness determination of the remedy at OU 2 cannot be made at this time until further information is obtained on the issues that affect protectiveness. Further information will be obtained by the following actions: 1) ADHS will complete the public health assessment on groundwater use in the area; and 2) the previous risk calculations will be reviewed in light of changes to both inhalation toxicity values and the model used to project indoor air risks from subsurface. Also, more evaluation needs to be conducted by EPA to ensure the remedy will achieve the hydraulic containment standards. An addendum will be prepared by EPA within 6 months to reassess the protectiveness of the remedy. In the meantime, the groundwater treatment system is meeting the required treatment standards, and the exposures at the site have been restricted through institutional controls to address immediate health threats: drinking water is being supplied to the public by the City of Phoenix, and ADWR permitting requirements on new groundwater wells provide a mechanism for which groundwater use may be identified and monitored. The site Health and Safety Plan is current and on-site, is sufficient to control health risks, and is being properly implemented.

XI. Next Review

The next five-year review for the site is required by the end of September 2006, within five years of signature of this review.

ATTACHMENT 1
Site Location Map



ATTACHMENT 2
Chemicals of Potential Concern

Table 1. Chemicals of Potential Concern, and range of concentrations detected

Chemical	Min. Detected	Max. Detected
INORGANIC CHEMICALS (reported in parts per million)		
Arsenic	0.005	2.6
Boron	0.14	7.5
Cadmium	0.005	0.024
Chromium (VI)	0.07	0.15
Chromium (total)	0.01	0.24
Cyanide	0.01	0.21
Fluoride	0.2	25
Lead	0.002	0.08
Manganese	0.01	8.13
Nickel	0.02	0.22
Nitrate	0.37	92
Silver	0.1	0.1
Sulfate	9	3400
Thallium	0.0009	0.014
Zinc	0.01	2
ORGANIC CHEMICALS (reported in parts per billion)		
Benzene	2.3	2.3
Bromodichloromethane	0.26	314
Carbon Tetrachloride	0.3	0.6
Chlorobenzene	0.3	1300
Chloroform	0.2	1500
Chloromethane	2.1	14
Dibromochloromethane	0.2	1.1
1,2-Dichlorobenzene	0.88	5600
1,1-Dichloroethane	0.09	1300
1,2-Dichloroethane	0.2	1500
1,4-Dichlorobenzene	36.9	36.9
1,2 & 1,4-Dichlorobenzene	0.2	65000
1,1-Dichloroethylene	0.3	26600
1,2-Dichloroethylene	0.2	7000
Dichloromethane	2.7	170000
trans-1,3-Dichloropropene	17.9	17.9
Tetrachloroethylene	0.2	30000
1,1,1-Trichloroethane	0.2	330000
1,1,2-Trichloroethane	4	4
Trichloroethylene	0.2	4100000
Vinyl Chloride	1.4	20000

ATTACHMENT 3
Summary of Deliverables Under UAO

Attachment 3
REVISED Summary of Minor Submittals and Major Deliverables for the Remedial Action at
Motorola 52nd Street, Operable Unit Two

SECTION	SUBMITTALS AND DELIVERABLES	NO. OF COPIES	DUE DATE (calendar days)	ESTIMATED EPA REVIEW PERIOD (working days)
1.3.8	Conversation/Meeting Notes	4	2 days after conversation/meeting	NA
2.1.1	Notification of Supervising Contractor (List of Alternate Contractors) (Second Notification of Supervising Contractor)	4 4 4	75 days after UAO Effective Date (15 days after EPA Disapproval) (30 days after EPA Authorization to Proceed)	15 days after receipt of notification 15 days after receipt of list NA
2.1.3	Site Visit Report	4	10 days after site visit	10 days after receipt of report
2.1.5.1	Draft RA Work Plan	4	90 days after EPA Authorization to Proceed	60 days after receipt of Draft Work Plan
2.1.5.3	Final RA Work Plan	4	30 45 days after receipt of EPA comments on Draft RA Work Plan	15 days after receipt of Final Work Plan
2.2.1	Status Reports	4	Monthly and/or as directed by RPM	NA
4.1	Draft Site Management Plan (SMP)	4	90 days after EPA Authorization to Proceed	60 days after receipt of SMP
4.1	Revised SMP	4	30 45 days after receipt of EPA comments	NA
4.1.1	Draft Health and Safety Plan (HASP)	4	90 days after EPA Authorization to Proceed	60 days after receipt of plan

SECTION	SUBMITTALS AND DELIVERABLES	NO. OF COPIES	DUE DATE (calendar days)	ESTIMATED EPA REVIEW PERIOD (working days)
4.1.1	Revised HASP	4	30 45 days after receipt of EPA comments	NA
4.1.2	Draft Sampling and Analysis Plan (SAP)	4	90 days after EPA Authorization to Proceed	60 days after receipt of plan
4.1.2	Revised SAP	4	30 45 days after receipt of EPA comments	NA
4.2	Draft Pollution Control & Mitigation Plan (PCMP)	4	90 days after EPA Authorization to Proceed	60 days after receipt of plan
4.2	Revised PCMP	4	30 45 days after receipt of EPA comments	NA
4.3	Draft Construction Quality Assurance (CQA) Plan	4	90 days after EPA Authorization to Proceed	60 days after receipt of plan
4.3	Revised CQA Plan	4	30 45 days after receipt of EPA comments	NA
5.1	Construction completion and operational testing	NA	616 days after approval of Final Work Plan	NA
5.3	Construction Completion Notification	4	15 days after construction completion & operational testing	NA
6.1	Draft Operations and Maintenance Manual (O&M)	4	480 days after approval of Final Work Plan	30 days after receipt of plan

SECTION	SUBMITTALS AND DELIVERABLES	NO. OF COPIES	DUE DATE (calendar days)	ESTIMATED EPA REVIEW PERIOD (working days)
6.1	Draft Revised O&M Manual	4	30 days after construction completion & operational testing	30 days after receipt of report
6.1	Final O&M Manual	4	30 days after receipt of EPA comments	NA
7.1.1	Pre-Final Inspection Report	4	30 days after Pre-Final Inspection	NA
7.1.2	Construction Completion Report	4	45 days after Final Inspection	30 days after receipt of report
7.3	Start-Up Report	4	30 days after completion of Start-Up	30 days after receipt of report
8.2.1	Draft Remedial Action Report	4	455 days after Start-Up Report	60 days after receipt of report
8.2.3	Final Remedial Action Report	4	30 days after receipt of EPA comments	NA
9.1	Progress Reports	4	Monthly and as needed by RPM	NA
9.2	OU2 Effectiveness Reports	4	455 days after Start-Up Report 820 days after Start-Up Report	60 days after receipt of report

ATTACHMENT 4
Fact Sheets



EPA

Motorola (52nd Street Plant) Superfund Site Update • *Ultimas Noticias Acerca del Sitio Superfund Motorola (Planta de 52nd St.)*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION 9 • SAN FRANCISCO, CALIFORNIA • NOVEMBER 1999
LA AGENCIA PARA LA PROTECCION DEL MEDIO AMBIENTE DE LOS ESTADOS UNIDOS • REGION 9 • SAN FRANCISCO, CALIFORNIA • NOVIEMBRE DE 1999

CONSTRUCTION OF GROUNDWATER TREATMENT SYSTEM PLANNED

INTRODUCTION

The United States Environmental Protection Agency (EPA) has prepared this fact sheet to update the community on activities at the Motorola 52nd Street Superfund* Site Operable Unit Two (OU2) Area. Construction of a groundwater treatment system in the OU2 area will begin soon. (See Figure 1, an OU2 Area site map). The OU2 Area is in eastern Phoenix where the water underground, or groundwater, is polluted by hazardous chemicals such as trichloroethylene (TCE). The treatment system that will be constructed will begin to clean up this contamination. Although the groundwater in this area is not currently used for drinking water, it is a potential future drinking water source. Drinking water is currently supplied by the City of Phoenix distribution system from surface water sources outside the OU2 area. This fact sheet provides background about the site, describes the planned construction and other activities at the site.

EPA encourages the public to participate and be involved in future community involvement activities throughout the Superfund cleanup process.

Cont'd. on pg. 2

*THERE IS A GLOSSARY OF THE BOLDDED TERMS USED IN THIS FACT SHEET ON PAGES 4-5 OF THIS DOCUMENT. / *SE INCLUYE UN GLOSARIO DE LOS TÉRMINOS EN NEGRITA UTILIZADOS EN ESTE BOLETÍN EN LAS PÁGINAS 4-5 DE ESTE DOCUMENTO.

PLAN DE CONSTRUCCION DE UN SISTEMA DE TRATAMIENTO DE AGUAS SUBTERRANEAS

INTRODUCCION

La Agencia de Protección Ambiental de los E.E.U.U. (EPA, por sus siglas en inglés) preparó este boletín para informar a la comunidad sobre las más recientes actividades en el sitio Superfund* de Motorola en sus instalaciones de 52nd Street, en la zona de la Unidad Operable Dos (UO2). Una de las actividades más importantes que se iniciarán

brevemente es la construcción de un sistema de tratamiento de aguas subterráneas en la zona UO2 (Véase la Figura 1, un mapa de la zona UO2). La zona UO2 se encuentra en la parte este de Phoenix donde el agua que se encuentra por debajo de la superficie, o agua subterránea, está contaminada por productos químicos peligrosos tales como el trichloroetileno

(TCE). El sistema de tratamiento a construirse comenzará a depurar esta contaminación. Aunque el agua subterránea en esta zona no se utiliza actualmente como agua potable, es una posible fuente futura de agua potable. Al presente, el agua potable es suministrada por el sistema de distribución de la ciudad de Phoenix de fuentes de aguas superficiales fuera de la zona de la UO2. Este boletín proporciona información sobre los antecedentes de este sitio y describe la construcción prevista así como otras actividades en el sitio.

Continúa en la página 2

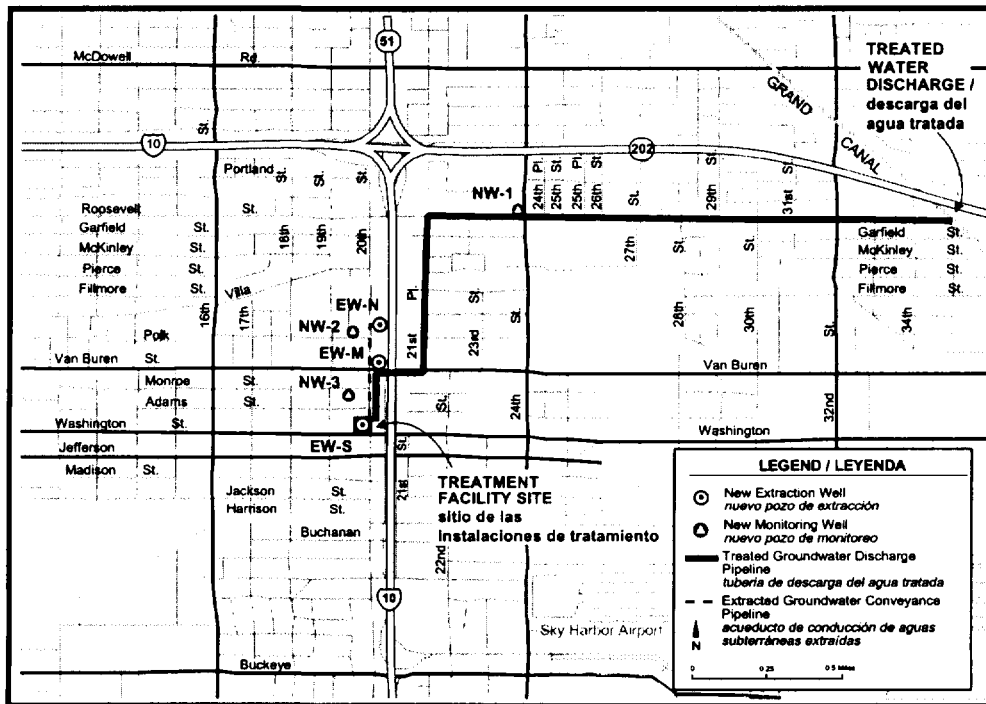


FIGURE 1: Map of Planned Construction Activities in the OU2 Area/
FIGURA 1: Mapa de las Actividades de Construcción Previstas para la Zona de la UO2

Construction Update

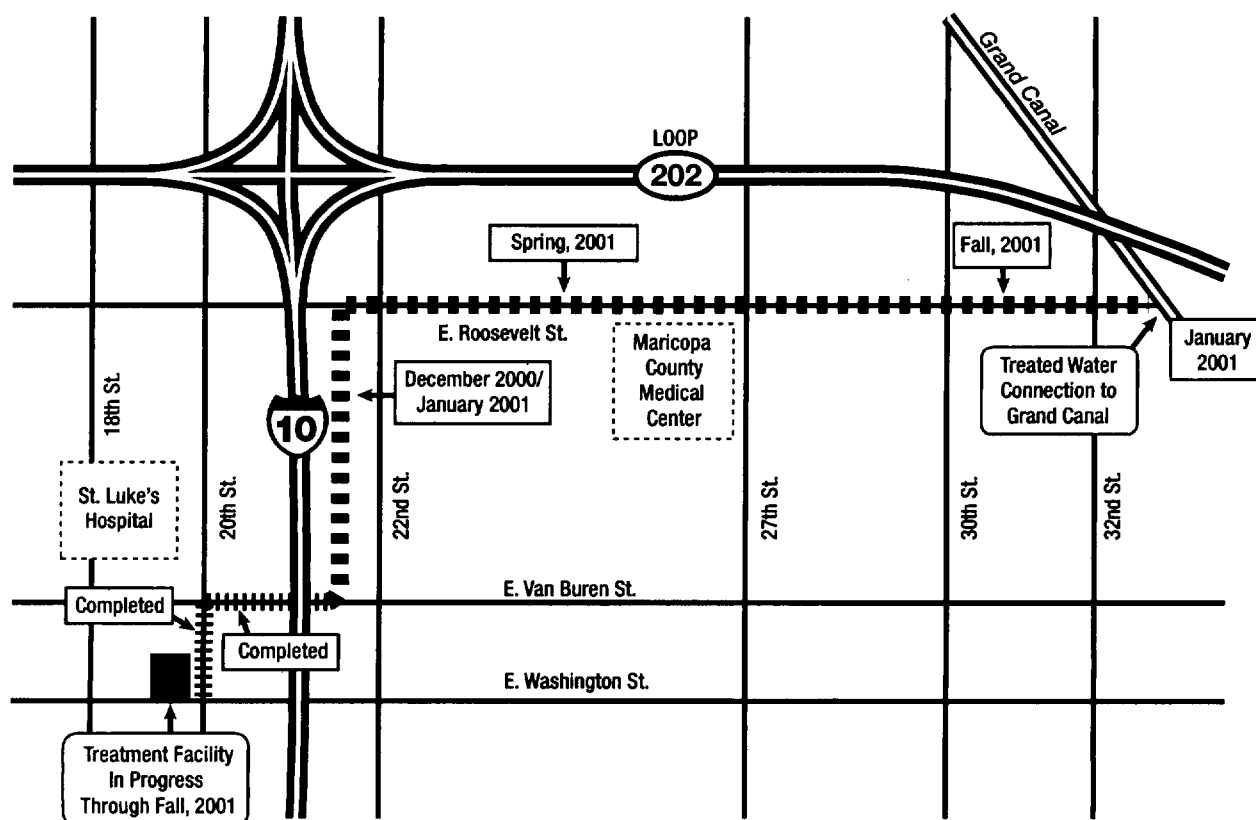
Groundwater Treatment System and Underground Pipeline

Summer, 2000 — Fall, 2001

Construction is well under way for a groundwater treatment system and underground pipeline to be built as part of the 52nd Street Superfund Site, Operable Unit 2 project.

The map below shows the location and general time frame of the construction activity. Streets along this route have been closed periodically to accommodate building, excavation and pipeline installation. This activity will continue through Fall, 2001.

The construction schedule is subject to change, so periodic updates will be provided throughout the project.



For more information,

call the construction information line at (602) 553-4386,
or call the U.S. EPA at 1-800-321-3075

(Updated December, 2000)



EPA

Motorola (52nd Street Plant) Superfund Site Update

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION 9 • SAN FRANCISCO, CALIFORNIA • FEBRUARY 2000

CONSTRUCTION PLANS FOR MOTOROLA 52nd STREET SUPERFUND SITE CLEANUP

Construction of a groundwater treatment system with associated groundwater wells and pipelines will be taking place in Phoenix from March 2000 through July 2001. See the map below for the location of the construction activities, and the table on the other side for the construction schedule. The system is being constructed to clean up groundwater in an area of the Motorola 52nd Street Superfund site known as Operable Unit 2 (OU2) that has been contaminated with hazardous chemicals such as trichloroethylene (TCE). The groundwater treatment system has been designed to do the following:

- pump out the contaminated groundwater at a total rate of 5,300 gallons per minute from three extraction wells;
- pipe the groundwater to a treatment plant;
- treat the water to meet drinking water standards; and
- discharge the treated water to the Salt River Project Grand Canal for irrigation uses.

Construction of the entire treatment system should be complete by August 2001. System inspections, testing and startup are planned to be finished by December 2001. Long-term operation of the system will begin after system startup and testing is complete. The treated water that will be discharged to the Grand Canal will be used by Salt River Project for agricultural irrigation and will not be used for drinking water.

OU2 Area Contamination

Trichloroethylene, a hazardous chemical, also known as TCE, and other similar chemicals, are present in the OU 2 groundwater. This contamination does not pose a current risk to local community members since drinking water is currently supplied by the City of Phoenix distribution system from surface water sources outside the OU2 area.

While the groundwater is not used currently for drinking water, it is a

potential future drinking water source. To protect this groundwater resource, Motorola Inc. and Honeywell (formerly AlliedSignal) will construct and operate this treatment system to remove the contamination and to prevent it from moving further west. The EPA is responsible for overseeing construction and operation of the OU2 treatment plant, and both the Arizona Department of Environmental Quality (ADEQ) and EPA are responsible for planning and overseeing the overall cleanup activities at the Motorola 52nd Street Superfund Site.

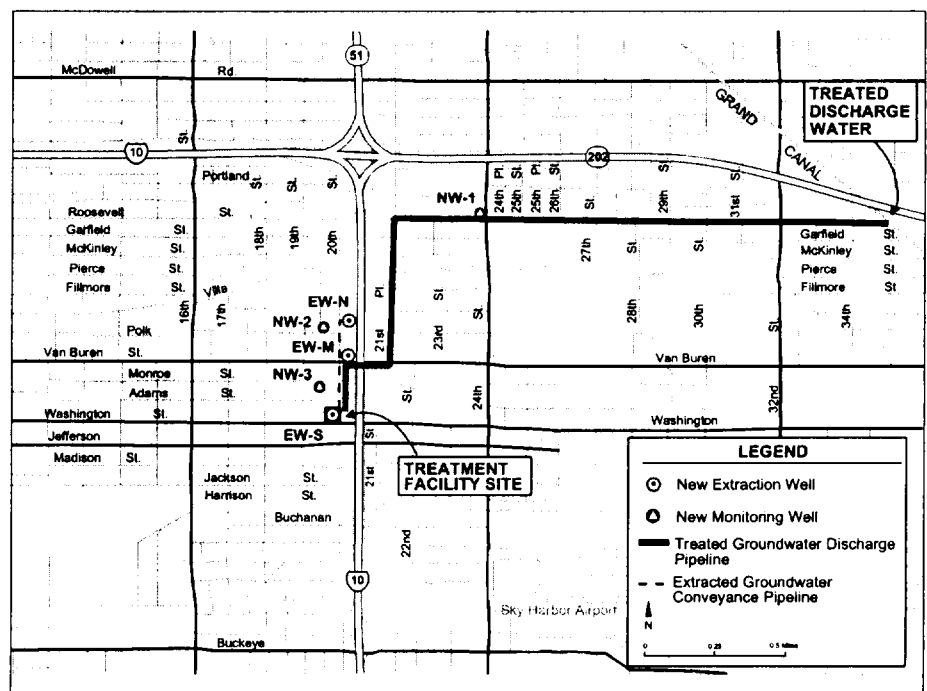


Figure 1: Motorola 52nd Street Superfund Site, showing OU2 Area

A Spanish version of this fact sheet is available. • Un versión en español de este folleto está disponible.

Construction Schedule

Construction of the OU2 treatment system is expected to begin in March 2000 and be completed in July 2001. The following table outlines the various steps in the construction process, the role each component of the treatment system will serve, and the projected start and completion dates for the system's components.

Construction Schedule	
System Component and Purpose	Period of Construction
Extraction Wells and Temporary Pipeline – install wells to pump contaminated groundwater to create the zone of capture. After installation, short-term tests of the well capacity will be conducted and this test water will be conveyed by temporary pipeline to the city sanitary sewer (along 20 th Street)	March 2000 – August 2000
Monitoring wells – install wells to monitor water levels to verify the zone of capture and monitor the reduction of contaminant concentration over time (24 th Street & Roosevelt and near 20 th Street and Van Buren)	April 2000 – May 2000
Pipelines – install pipelines to convey extracted water to treatment plant and to convey treated water to discharge point (20 th Street, Van Buren, 21 st Pl., Roosevelt St. to Grand Canal at 36 th St.)	May 2000 – March 2001
Treatment Plant – build a facility to remove TCE and other contaminants from groundwater prior to use (20 th St & Washington)	June 2000 – July 2001

Community Notification and Involvement

During construction of the treatment system, traffic detours and other construction impacts may inconvenience local community members. EPA is requiring dust control measures and limiting nighttime work to minimize noise and dust impacts. Additionally EPA, ADEQ, Motorola Inc., and Honeywell are coordinating efforts to notify community members as traffic detours and other construction activities are scheduled in their neighborhoods.

EPA encourages the public to participate in community involvement activities throughout the Superfund cleanup process for OU2. If you would like to be on the mailing list for future site updates or if you have any questions about this effort or EPA's involvement at the Motorola 52nd Street Superfund site, please contact:

Nadia Hollan
Remedial Project Manager
U.S. EPA, (SFD-7-1)
(415) 744-2363

Viola Cooper
Community Involvement
Coordinator
U.S. EPA, (SFD-3)
(415) 744-2188

75 Hawthorne Street
San Francisco, CA 94105

Email: hollan.nadia@epamail.epa.gov
Email: cooper.viola@epamail.epa.gov

...or You may call the EPA Toll-free Message Line
(1-800-231-3075) and we will return your call.

Technical documents related to the site can be found at the Information Repositories in the locations listed below.

Arizona Department of Environmental Quality
3033 N. Central Avenue
Phoenix, AZ
(602) 207-4420

USEPA Superfund Records Center
95 Hawthorne Street
San Francisco, CA
(415) 536-2000

City of Phoenix Public Libraries:
Saguaro Branch
2808 N. 46th Street
Phoenix, AZ
(602) 262-6801

Central Branch
1221 N. Central Avenue
Phoenix, AZ
(602) 262-4636

Learn more about EPA Superfund Sites on the Internet at: www.epa.gov/superfund

Certain EPA documents can be accessed electronically at this Web Site.

ATTACHMENT 5
Summary of Analytical Results from Treatment Plant

SUMMARY OF ANALYTICAL RESULTS
FACILITY INTAKE
62ND STREET SUPERFUND SITE, OU2 AREA
PHOENIX, ARIZONA

[illegible]

NXS - No numeric standard

TABLE 2
SUMMARY OF ANALYTICAL RESULTS
FACILITY DISCHARGE
62ND STREET SUPERFUND SITE, OJZ AREA
PHOENIX, ARIZONA

Reference Number 13632
Page 1 of 1

Estimated Pumping Rate																						
	FW-S	FW-M	FW-N																			
	850	1750	1350																			
	gpm	gpm	gpm																			
Total Pumping Rate:	3,950			gpm																		
						Sample	System Commissioning															
						Location	Facility Discharge															
ADFG	FW-S	FW-M	FW-N	Revised	Design	Frequency	Pre-Commissioning	2-Hour	1st Day	1st Day	2nd Day	3rd Day	4th Day	5th Day	6th Day	7th Day	8th Day	9th Day	10th Day	11th Day	12th Day	
Drinking	EW-S	EW-M	EW-N	Estimated	Estimated	Date	08/21/01	08/22/01	08/22/01	08/22/01	08/28/01	08/29/01	08/30/01	08/31/01	09/04/01	09/05/01	09/06/01	09/11/01	09/12/01	09/13/01	09/14/01	
Water	at 97 hours	at 117 hours	at 144 hours	Concentration	Concentration	Number	082101-JH-0001	082201-JH-0001	082201-JH-0008	082201-JH-0009	082801-JH-0001	082901-JH-0001	083001-JH-0001	083101-JH-0001	090401-JH-0001	090501-JH-0001	090601-JH-0001	091101-JH-0001	091201-JH-0001	091301-JH-0001	091401-JH-0001	
Standard						Status	Final	Final	Final	Final	Final	Final	Final	Final	Final	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	
Volatiles (Organic Compounds) (ug/L)																						
Benzene	5	ND(1.0)	ND(1.0)	ND(1.0)	1.00		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Bromodichloromethane	TTTHM	ND(1.0)	ND(1.0)	ND(1.0)	1.00		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Bromomethane	TTTHM	ND(2.0)	ND(2.0)	ND(2.0)	2.00		ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	
Chloroform	7	1.9	ND(1.0)	1.61	4.56		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Chloromethane	NNS	ND(2.0)	ND(2.0)	ND(2.0)	2.00		ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	
1,1-Dichloroethane	NNS	9.4	ND(1.0)	ND(1.0)	2.81	11.21	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
1,2-Dichloroethane	5	NA	NA	NA	NA		NA	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
1,1-Dichloroethene	7	10	2.4	ND(1.0)	3.56	9.78	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
cis-1,2-Dichloroethene	70	57	74	20	51.89	108.58	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
trans-1,2-Dichloroethene	100	ND(1.0)	1.6	ND(1.0)	1.27	3.05	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Tetrachloroethene	5	13	17	4	11.70	14.96	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Toluene	1,000	ND(1.0)	ND(1.0)	ND(1.0)	1.00		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
1,1,1-Trichloroethane	200	ND(1.0)	ND(1.0)	ND(1.0)	1.00		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Trichloroethene	5	200	280	110	204.68	310.79	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Trichlorofluoromethane	TTTHM	ND(4.0)	ND(4.0)	ND(4.0)	4.00		NA	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	ND(4.0)	
Vinyl Chloride	2	ND(0.50)	ND(0.50)	ND(0.50)	0.50		ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	
Xylene	10,000	ND(1.0)	ND(1.0)	ND(1.0)	1.00		ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
Total VOCs		305.9	391.4	151.5	291.010																	
Metals (ug/L)																						
Arsenic, Dissolved		0.0053	0.0052	0.0052	0.01	--						0.0062										
Barium, Dissolved		0.077	0.051	0.044	0.05	--						0.06										
Calcium, Dissolved		91	92	100	94.52	92																
Copper		NA	NA	NA	NA							ND(0.020)										
Chromium, Dissolved		0.055	ND(0.10)	ND(0.004)	0.46	--						ND(0.010)										
Iron, Dissolved		ND(0.10)	ND(0.10)	ND(0.10)	0.10							ND(0.20)										
Magnesium, Dissolved		14	13	36	34.24	36																
Potassium		NA	NA	NA	NA							7										
Sodium		NA	NA	NA	NA							310										
Vanadium		NA	NA	NA	NA							ND(0.050)										
General Chemistry (ug/L)																						
Alkalinity as CaCO3		310	300	300	302.15	320						320										
Bicarbonate Alkalinity as CaCO3		310	300	300	302.15	320						320										
Chloride		260	280	300	282.53	320						290										
Hardness, Dissolved (CaCO3)		11	370	400	300.87	ND(5.0)						370										
Nitrate-N		6.1	5.9	6.4	6.11	6.9						1.8										
Nitrite-N		ND(0.10)	ND(0.10)	ND(0.10)	0.10							ND(1.0)										
Total Kjeldahl Nitrogen		ND(0.5)	1.4	NA	0.73	380						0.56										
Dissolved Organic Carbon		1	NA	ND(1.0)	0.56	0.04						ND(1.0)										
Sulfate		190	NA	NA	40.89	270						290										
Total Suspended Solids		ND(10)	ND(10)	ND(10)	10.00							ND(10)										
Total Dissolved Solids		1100	1300	1300	1256.96	1200						1300										
Ammonia-N		0.58	ND(0.10)	ND(0.5)	0.34	--						ND(0.50)										
Fluoride		0.27	NA	NA	0.06	0.25						0.29										
Orthophosphate		0.08	NA	NA	0.02	--						ND(0.50)										
Phosphorus		0.053	0.055	0.069	0.06							ND(0.050)										
Total Organic Carbon		1.3	ND(1.0)	ND(1.0)	1.06	1.4						ND(1.0)										
Oil & Grease		ND(1.0)	NA	NA	0.22	--						ND(5.0)										

Notes:
For compounds that are non-detect, the quantitation limit was used in the weighted average.
TTTHM - Total Trihalomethanes - 100 ug/l.
NNS - No numbers, standard

TABLE 4

Reference Number 13932

Page 1 of 1

**SUMMARY OF ANALYTICAL RESULTS
GRAND CANAL DISCHARGE
52ND STREET SUPERFUND SITE, OU2 AREA
PHOENIX, ARIZONA**

Estimated Pumping Rate			
FW-S	850	gpm	
EW-M	1,750	gpm	
FW-N	1,350	gpm	
Total Pumping Rate:	3,950	gpm	

ADEQ Drinking Water Standard	EW-S a 97 hour	EW-M a 119 hours	FW-N a 44.5 hours	Revised Estimated Influent Concentration	Design Estimated Influent Concentration	Sample Location Frequency Date Number Status	System Commissioning											
							SRP Discharge				SRP Upgradient				SRP Downgradient			
							1st Day	2nd Week	3rd Week	4th Week	1st Day	2nd Week	3rd Week	4th Week	1st Day	2nd Week	3rd Week	4th Week
							08/22/2001 0822010-J14-0007 Final	08/29/2001 082901-J14-0004 Final	09/05/2001 090501-J14-0004 Preliminary	09/12/2001 091201-J14-0004 Preliminary	08/22/2001 082201-J14-0005 Final	08/29/2001 082901-40005 Final	09/05/2001 090501-4001 Preliminary	09/12/2001 091201-J14-0006 Preliminary	08/22/2001 082201-J14-0006 Final	08/29/2001 082901-J14-0003 Final	09/05/2001 090501-J14-0005 Preliminary	09/12/2001 091201-J14-0005 Preliminary
Volatiles Organic Compounds (ug/L)																		
Benzene	5	NDX(1.0)	NDX(1.0)	NDX(1.0)	1.00		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Bromodichloromethane	TTTMM	NDX(1.0)	NDX(1.0)	NDX(1.0)	1.00		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Bromomethane	TTTMM	NDX(2.0)	NDX(2.0)	NDX(2.0)	2.00		NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)
Chloroform	TTTMM	2	1.9	NDX(1.0)	1.61	4.56	13	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Chloromethane	NNS	NDX(2.0)	NDX(2.0)	NDX(2.0)	2.00		NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)	NDX(2.0)
1,1-Dichloroethane	NNS	9.4	NDX(1.0)	NDX(1.0)	2.81	11.23	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
1,2-Dichloroethane	5	NA	NA	NA	NA		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
1,1,1-Trichloroethane	7	10	2.4	NDX(1.0)	3.56	9.78	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
cis-1,2-Dichloroethene	70	57	74	20	51.89	108.58	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
trans-1,2-Dichloroethene	100	NDX(1.0)	1.6	NDX(1.0)	1.27	3.05	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Tetrachloroethene	5	13	17	4	11.70	14.96	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Toluene	1,000	NDX(1.0)	NDX(1.0)	NDX(1.0)	1.00		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
1,1,1-Trichloroethane	200	NDX(1.0)	NDX(1.0)	NDX(1.0)	1.00		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Trichloroethene	5	200	280	110	204.68	310.79	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Trichlorofluoromethane	TTTMM	NDX(4.0)	NDX(4.0)	NDX(4.0)	4.00		NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)	NDX(4.0)
Vinyl Chloride	2	NDX(0.50)	NDX(0.50)	NDX(0.50)	0.50		NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)	NDX(0.50)
Xylene	10,000	NDX(1.0)	NDX(1.0)	NDX(1.0)	1.00		NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)	NDX(1.0)
Total VOC's		305.9	391.4	151.5	291.010													
Metals (mg/L)																		
Arsenic, Dissolved		0.0053	0.0052	0.0052	0.01	--	NDX(0.0030)		NDX(0.050)									
Barium, Dissolved		0.077	0.051	0.044	0.05	--					0.048		0.051					
Calcium, Dissolved		91	92	100	94.52	92					41		92					
Copper		NA	NA	NA	NA		NDX(0.020)						NDX(0.020)					
Chromium, Dissolved		0.055	NDX(1.0)	NDX(0.004)	0.46	--	NDX(0.010)		NDX(0.010)				NDX(0.010)					
Iron, Dissolved		NDX(0.10)	NDX(0.10)	NDX(0.10)	0.10		NDX(0.20)						NDX(0.20)					
Magnesium, Dissolved		34	33	36	34.24	36					24		33					
Potassium		NA	NA	NA	NA						30		7.3					
Sodium		NA	NA	NA	NA						250		320					
Vanadium		NA	NA	NA	NA		NDX(0.050)		NDX(0.050)									
General Chemistry (mg/L)																		
Alkalinity as CaCO3		310	300	300	302.15	320					230		320					
Bicarbonate Alkalinity as CaCO3		310	300	300	302.15	320					230		320					
Chloride		260	280	300	282.53	320					260		310					
Hardness, Dissolved (CaCO3)		1.1	370	400	300.87	NDX(5.0)					200		370					
Nitrate-N		6.1	5.9	6.4	6.11	6.9					1.4		3.5					
Nitrite-N		NDX(0.10)	NDX(0.10)	NDX(0.10)	0.10		NDX(1.0)		NDX(1.0)				NDX(1.0)					
Total Kjeldahl Nitrogen		NDX(0.5)	1.4	NA	0.73	380					NDX(0.50)		NDX(0.50)					
Dissolved Organic Carbon		1	NA	NDX(1.0)	0.56	0.04					2		1.7					
Sulfate		190	NA	NA	40.89	270					210		280					
Total Suspended Solids		NDX(10)	NDX(10)	NDX(10)	10.00						25		NDX(10)					
Total Dissolved Solids		1100	1300	1300	1256.96	1200					1000		1300					
Ammonia-N		0.58	NDX(0.10)	NDX(0.5)	0.34	--	NDX(0.50)		NDX(0.50)				NDX(0.50)					
Fluoride		0.27	NA	NA	0.06	0.25					0.32		NDX(1.0)					
Orthophosphate		0.08	NA	NA	0.02	--	NDX(0.50)		NDX(0.50)				NDX(0.50)					
Phosphorus		0.053	0.055	0.069	0.06	--	NDX(0.050)		NDX(0.050)				NDX(0.050)					
Total Organic Carbon		1.3	NDX(1.0)	NDX(1.0)	1.06	1.4					4		NDX(1.0)					
Oil & Grease		NDX(1.0)	NA	NA	0.22	--	NDX(5.0)		NDX(5.0)									

Notes:

For compounds that are non-detect, the quantitation limit was used in the weighted average.

TTTMM - Total Trihalomethanes = 100 ug/L

NNS - No numeric standard

ATTACHMENT 6
Comparison of Water Action Limits
with Treatment Plant Effluent Test Results

Attachment 4: Comparison of Water Action Limits with Treatment Plant Effluent Test Results

Note: The sample results equalling or exceeding a regulatory limit are highlighted in bold box

Analyte (***, bold =Chemical of Potential Concern Identified in ROD)	Group	Surface Water Limits for Phoenix Area Canals- Agl (mg/L)	Surface Water Limits for Phoenix Area Canals - AgL (mg/L)	State of Arizona MCLs (mg/L)	Federal Primary MCLs (mg/L)	Maximum Treated Effluent Discharge Test Results (mg/L)
Alkalinity as CaCO3	Inorganics					320
Ammonia_N	Inorganics					ND
Bicarbonate Alkalinity	Inorganics					320
Chloride	Inorganics					310
Cyanide***	Inorganics	NNS	0.2 T	0.2	0.2	ND
DOC	Inorganics					2
Fluoride***	Inorganics			4	4	0.32
Hardness, Dissolved	Inorganics					370
Nitrate (as N)	Inorganics	NNS	NNS	10	10	3.5
Nitrate (as NO3)***	Inorganics					ND
Nitrate/Nitrite (Total)	Inorganics	NNS	NNS	10		3.5
Nitrite (as N)	Inorganics	NNS	NNS	1	1	ND
Orthophosphate	Inorganics					ND
Phosphorus	Inorganics					ND
Sulfate***	Inorganics					280
TDS	Inorganics					1300
TOC	Inorganics					4
Total Kjeldahl Nitrogen	Inorganics					ND
TSS	Inorganics					25
Aluminum (dissolved)	Metals					0.2
Antimony	Metals	NNS	NNS	0.006	0.006	ND
Arsenic *** (dissolved)	Metals	2 T	0.2 T	0.05	0.05*	ND
Barium (dissolved)	Metals	NNS	NNS	2	2	0.067
Beryllium	Metals	NNS	NNS	0.004	0.004	ND
Boron	Metals	1 T	NNS			1
Cadmium*** (dissolved)	Metals	0.050 T	0.050 T	0.005	0.005	ND
Calcium (dissolved)	Metals					92
Chromium*** (dissolved) (total)	Metals	1 T	1 T	0.1	0.1	ND
Chromium III	Metals					ND
Chromium VI***	Metals	NNS	NNS			ND
Cobalt	Metals					0.003
Copper	Metals	5 T	0.5 T	1.3	1.3TT	ND
Iron (dissolved)	Metals					4.7
Lead*** (dissolved)	Metals	10 T	0.1 T	0.015	0.015TT	0.009
Magnesium (dissolved)	Metals					33
Manganese***	Metals	10	NNS			0.032
Mercury	Metals	NNS	0.010 T	0.002	0.002	ND
Molybdenum	Metals					0.008
Nickel	Metals	NNS	NNS	0.1		0.05
Potassium	Metals					30
Selenium (dissolved)	Metals	0.020 T	0.050 T	0.05	0.05	ND
Silver*** (dissolved)	Metals	NNS	NNS			ND
Sodium	Metals					320

Attachment 4: Comparison of Water Action Limits with Treatment Plant Effluent Test Results

Note: The sample results equalling or exceeding a regulatory limit are highlighted in bold box

Analyte (***, bold =Chemical of Potential Concern Identified in ROD)	Group	Surface Water Limits for Phoenix Area Canals-Agl (mg/L)	Surface Water Limits for Phoenix Area Canals - AgL (mg/L)	State of Arizona MCLs (mg/L)	Federal Primary MCLs (mg/L)	Maximum Treated Effluent Discharge Test Results (mg/L)
Thallium***	Metals	NNS	NNS	0.002	0.002	ND
Vanadium	Metals					ND
Zinc***	Metals	10 T	25 T	2.1 T		0.93
1,1,1,2-Tetrachloroethane	VOCs					ND
1,1,1-Trichloroethane***	VOCs	NNS	NNS	0.2	0.2	ND
1,1,2,2-Tetrachloroethane	VOCs	NNS	NNS			ND
1,1,2-Trichloroethane***	VOCs	NNS	NNS	0.005	0.005	ND
1,1-Dichloroethane***	VOCs	NNS	NNS			ND
1,1-Dichloroethene***	VOCs	NNS	NNS	0.007	0.007	ND
1,1-Dichloropropene	VOCs					ND
1,2,3-Trichlorobenzene	VOCs					ND
1,2,3-Trichloropropane	VOCs					ND
1,2,4-Trichlorobenzene	VOCs	NNS	NNS	0.07	0.07	ND
1,2,4-Trimethylbenzene	VOCs					ND
1,2-Dibromo-3-chloropropane	VOCs	NNS	NNS	0.0002	0.0002	ND (Pump Test)
1,2-Dichlorobenzene***	VOCs	NNS	NNS	0.6	0.6	ND
1,2-Dichloroethane***	VOCs	NNS	NNS	0.005	0.005	ND
1,2-Dichloropropane	VOCs	NNS	NNS	0.005	0.005	ND
1,3,5-Trimethylbenzene	VOCs					ND
1,3-Dichlorobenzene	VOCs	NNS	NNS			ND
1,4-Dichlorobenzene***	VOCs	NNS	NNS	0.075	0.075	ND
1,4-Isopropyltoluene	VOCs					ND
1,3-Dichloropropane	VOCs					ND
2,2-Dichloropropane	VOCs					ND
2-Chlorotoluene	VOCs					ND
4-Chlorotoluene	VOCs					ND
Benzene***	VOCs	NNS	NNS	0.005	0.005	ND
Bromobenzene	VOCs					ND
Bromochloromethane	VOCs					ND
Bromodichloromethane***	VOCs	NNS	NNS			ND
Bromoform	VOCs	NNS	NNS			ND
Bromomethane	VOCs	NNS	NNS			ND
Carbon tetrachloride***	VOCs	NNS	NNS	0.005	0.005	ND
Chlorobenzene (monochlorobenzene)**	VOCs	NNS	NNS	0.1	0.1	ND
Chloroethane	VOCs	NNS	NNS			ND
Chloroform***	VOCs	NNS	NNS			0.013
Chloromethane***	VOCs	NNS	NNS			ND
cis-1,2-Dichloroethene***	VOCs	NNS	NNS	0.07	0.07	ND
1,3-Dichloropropene	VOCs	NNS	NNS			ND
cis-1,3-Dichloropropene	VOCs					ND
Dibromochloromethane***	VOCs	NNS	NNS			ND
Dibromomethane	VOCs					ND
Dichlorodifluoromethane	VOCs					ND
Dichloromethane (methylene chloride)**	VOCs	NNS	NNS	0.005	0.005	ND

Attachment 4: Comparison of Water Action Limits with Treatment Plant Effluent Test Results

Note: The sample results equalling or exceeding a regulatory limit are highlighted in bold box

Analyte (***, bold =Chemical of Potential Concern Identified in ROD)	Group	Surface Water Limits for Phoenix Area Canals- AgI (mg/L)	Surface Water Limits for Phoenix Area Canals - AgL (mg/L)	State of Arizona MCLs (mg/L)	Federal Primary MCLs (mg/L)	Maximum Treated Effluent Discharge Test Results (mg/L)
Ethylbenzene	VOCs	NNS	NNS	0.7	0.7	ND
Ethylene dibromide (EDB)	VOCs	NNS	NNS	0.00005	0.00005	ND
MTBE	VOCs					ND
n-Butylbenzene	VOCs					ND
n-Propylbenzene	VOCs					ND
sec-Butylbenzene	VOCs					ND
Styrene	VOCs	NNS	NNS	0.1	0.1	ND
tert-Butylbenzene	VOCs					ND
Tetrachloroethene***	VOCs	NNS	NNS	0.005	0.005	ND
Toluene	VOCs	NNS	NNS	1	1	ND
Total Trihalomethanes	VOCs	NNS	NNS	0.1	0.1	ND
Trans-1,2-Dichloroethene	VOCs	NNS	NNS	0.1	0.1	ND
trans-1,3-Dichloropropene***	VOCs					ND
Trichloroethene***	VOCs	NNS	NNS	0.005	0.005	ND
Trichlorofluoromethane	VOCs					ND
Vinyl chloride***	VOCs	NNS	NNS	0.002	0.002	ND
Xylenes (total)	VOCs	NNS	NNS	10	10	0.0008

* EPA is revising the current drinking water standard for arsenic from 0.050 mg/L to 0.010 mg/L

References:

(1)Arizona Administrative Code: http://www.sosaz.com/public_services/Title_18/18-11.htm
Surface Water Limits are for the Phoenix Area Canals

Phoenix Area Canals: Below Municipal WTP intakes and all other locations

AgL: Agricultural Livestock Watering

AgI: Agricultural Irrigation

(2)Federal MCLs: <http://www.epa.gov/safewater/mcl.html>

(3)Arizona MCLs: <http://www.adeq.state.az.us/envirom/water/dw/download>

Abbreviations:

MCLs: Maximum Contaminant Levels

NNS: No numerical standard

T: Total Recoverable

ND: Not Detected above quantitation limit

TT: Treatment Technique

ATTACHMENT 7
Confirmation of Chemical Specific Toxicity Values

Attachment 6: Confirmation of Chemical Specific Toxicity Values

Chemical of Concern	Cancer Slope Factors (mg/kg-day) ¹		Non-Cancer Reference Doses (mg/kg-day)		Impact on Human Health Risk Assessment
	oral/inhalation		oral/inhalation		
	Previous	Current	Previous	Current	
Arsenic	1.8/--	1.5/15	0.0003/--	0.0003/--	No significant impact on risk. Change in inhalation toxicity values noted, but inhalation is not expected for non-volatile chemicals.
Boron	--/--	--/--	0.09/--	0.09/0.0057	No significant impact on risk. Inhalation is not expected for non-volatile chemicals.
Cadmium	--/--	--/6.3	0.0005/--	0.0005/--	No significant impact on risk. Change in inhalation toxicity values noted, but inhalation is not expected for non-volatile chemicals.
Chromium (III)	--/--	--/--	1.0/--	1.5/--	No significant impact on risk.
Chromium (VI)	--/0.012	--/290	0.005/--	0.003/--	No significant impact on risk. Change in inhalation toxicity values noted, but inhalation is not expected for non-volatile chemicals.
Cyanide	--/--	--/--	0.02/--	0.02/0.00086	No significant impact on risk. Inhalation is not expected for non-volatile cyanide compounds.
Fluoride	--/--	--/--	0.06/--	0.06/--	No change.
Lead	--/--	--/--	--/--	--/--	No change.
Manganese	--/--	--/--	0.1/0.0001	0.024/0.000014	No significant impact on risk. Inhalation is not expected for non-volatile chemicals.
Nickel	--/--	--/--	0.02/--	0.02/--	No change.
Nitrate	--/--	--/--	1.6/--	1.6/--	No change.
Silver	--/--	--/--	0.005/--	0.005/--	No change.
Sulfate	--/--	--/--	--/--	--/--	No change.
Thallium	--/--	--/--	0.00007/--	0.00007/--	No change.

Zinc	--/--	--/--	0.2/--	0.3/--	No significant change.
Benzene	0.029/0.029	0.055/0.027	--/--	0.003/0.0017	Increase in risk under future scenario if groundwater is used for domestic purposes.
Bromodichloro-methane	0.13/--	0.062/--	0.02/--	0.02/--	Slight decrease in risk.
Carbon Tetrachloride	0.13/0.000015	0.13/0.053	0.0007/--	0.0007/--	Increase in inhalation risk.
Chlorobenzene	--/--	--/--	0.02/0.005	0.02/0.017	Increase in inhalation risk.
Chloroform	0.0061/0.081	0.0061/0.081	0.01/--	0.01/0.000086	Increase in non-cancer inhalation risk.
Chloromethane	0.013/0.018	0.013/0.0063	--/--	--/0.086	Slight decrease in cancer inhalation risk. Increase in non-cancer inhalation risk.
Dibromochloro-methane	0.084/--	0.084/--	0.02/--	0.02/--	No change.
1,2-Dichlorobenzene	--/--	--/--	0.09/--	0.09/0.057	Increase in non-cancer inhalation risk.
1,1-Dichloroethane	--/--	--/--	0.1/0.1	0.1/0.1	No change.
1,2-Dichloroethane	0.091/0.000026	0.091/0.091	--/--	0.03/0.0014	Increase in ingestion/inhalation risk.
1,4-Dichlorobenzene	0.024/--	0.024/0.022	--/--	0.03/0.23	Increase in ingestion/inhalation risk.
1,1-Dichloroethylene	0.6/1.2	0.6/0.18	0.009/--	0.009/--	Decrease in inhalation risk.
1,2-Dichloroethylene	--/--	--/--	0.02/--	0.02/--	No change.
Dichloromethane	0.0075/0.00000047	0.0075/0.0016	0.06/--	0.06/0.86	Increase in inhalation risk.
trans-1,3-Dichloropropene	0.18/0.000037	0.1/0.014	0.0003/0.0017	0.03/0.0057	Decrease in ingestion/inhalation risk.
Tetrachloroethylene	0.051/0.0011	0.052/0.002	0.01/--	0.01/0.11	Increase in inhalation risk.
1,1,1-Trichloroethane	--/--	--/--	0.09/0.3	0.02/0.29	Increase in ingestion risk.
1,1,2-Trichloroethane	0.057/0.000016	0.057/0.056	0.004/--	0.004/--	Increase in inhalation risk.
Trichloroethylene	0.011/0.017	0.011/0.006	--/--	--/--	Slight change in inhalation risk. In the near future, the reassessment of TCE toxicity is likely to result in an increase in both ingestion/inhalation risks.
Vinyl Chloride	1.9/0.29	1.5/0.031	--/--	0.003/0.029	Increase in risk for children.